

MECHANICAL ENGINEERING (MENG)

MENG1110 | Engineering Drawings & 3D Design | Lecture/Laboratory (4 Credits)

Create 3D solid models and assemblies using SolidWorks. Interpret engineering prints; create detail and assembly drawings according to standards. Use freehand drawing as a graphical communication tool.

MENG1210 | Machining for Engineers Lab | Laboratory (2 Credits)

Employ metalworking techniques using typical shop equipment including mills, lathes, grinders, saws, and drills. Utilize hand tools to prep stock and finish edges.

Corequisite(s): MENG1220

MENG1220 | Machining for Engineers | Lecture (2 Credits)

Use theory and understanding of machining operations to plan work to create parts efficiently.

Prerequisite(s): MENG1110 Or MDES1110

Corequisite(s): MENG1210

MENG1230 | Statics | Lecture (3 Credits)

Identification, recognition and calculations associated with forces acting on rigid bodies at rest. Use vector analysis to analyze concurrent forces, non-concurrent forces, friction forces, centroids and moments.

Prerequisite(s): MATH2810

MENG2230 | Dynamics | Lecture (3 Credits)

Theory and calculations associated with kinematics and kinetics of particles, systems of particles and rigid bodies. Analyze the application of Newton's laws to the planar motion of rigid bodies.

Prerequisite(s): MENG1230 And MATH2820

MENG2240 | Mechanics of Materials | Lecture (3 Credits)

Discover how materials behave under load including deformation under various loading profiles. Apply concepts to design of mechanical members such as a beams, shafts, columns, and other load bearing devices.

Prerequisite(s): MENG1230

MENG3111 | Design for Manufacturability with Lab | Lecture/Laboratory (3 Credits)

Introduction to common manufacturing processes, with emphasis on the principles of design for each process. Processes include: sheet metal forming, casting, welding, and plastic fabrication. Design and create parts using common manufacturing processes, such as casting, injection molding, and sheet metal forming processes.

Prerequisite(s): MENG1210 And MENG1220

MENG3130 | Thermodynamics | Lecture (4 Credits)

Introduction to thermodynamic analysis which provides a foundation for subsequent thermoscience courses, e.g. fluid dynamics, heat transfer, HVACR. Application of the laws of thermodynamics to the analysis of power and refrigeration cycles is a main focus.

Prerequisite(s): PHYS1800 And MATH1821

MENG3140 | Materials Science | Lecture (3 Credits)

Identify different types of materials, their properties, and appropriate uses. Processes that change material properties include: alloy composition, heat treatment, coatings, and other modifications.

Prerequisite(s): CHEM2110

MENG3211 | GD&T & Measurements with Lab | Lecture/Laboratory (4 Credits)

Apply principles of physical measurements and error analysis to evaluate mechanical measurements. Create prints that include callouts for standards of accuracy using ASME/ANSI geometric dimensioning and tolerance standards. Use lab metrology equipment to assess the geometric dimensions and tolerances of parts, and to perform other measurements such as temperature, pressure, and flow.

Prerequisite(s): MATH2260

MENG3212 | Measurements and Lab | Lecture/Laboratory (4 Credits)

Apply principles of physical measurements and error analysis to evaluate mechanical measurements. Create prints that include callouts for standards of accuracy using ASME/ANSI geometric dimensioning and tolerance standards. Use lab metrology equipment to assess the geometric dimensions and tolerances of parts, and to perform other measurements such as temperature, pressure, and flow.

Prerequisite(s): MATH2260

MENG3230 | Fluid Mechanics | Lecture (3 Credits)

Introduction to fluid statics and mechanics; laminar and turbulent flow with associated calculations. Applications to industry are used in problems.

Prerequisite(s): MATH2810, MATH2820, MENG3130, And MENG2240

MENG3240 | Failure Analysis & Design | Lecture (2 Credits)

Examine advanced topics in modeling, design and best practices for machines, tooling and system assemblies. Evaluate components for protection against failure from low cycle fatigue, high cycle fatigue, ductile overload, corrosion.

Prerequisite(s): MENG2240

MENG3241 | Machine Design & Failure Analysis | Lecture (3 Credits)

Discussion of failure modes. Evaluate components for protection against failure from low cycle fatigue, high cycle fatigue, ductile overload, corrosion. Selection of common machine elements (bearings, gears, springs, etc.) and basic analysis is developed.

Prerequisite(s): MENG2240

MENG3250 | Heat Transfer | Lecture (3 Credits)

Examine the fundamentals of heat transfer modes, including conduction, convection, and radiation. Calculations for each mode are included.

Prerequisite(s): MATH2820 And MENG3130

MENG4111 | Control of Dynamic Systems w/ Lab | Lecture/Laboratory (4 Credits)

Introduction to the fundamentals of controls, covering foundational controls theory (first and second order system response, transfer functions, and design of control systems). Analyze the response of dynamic systems, and then apply these techniques, using a PID control, to the control of real world engineering systems. Possible applications include fluid power, heat transfer, and mechanical systems.

Prerequisite(s): MENG2230 And MATH2820

MENG4130 | Finite Element Analysis | Lecture (3 Credits)

Finite element modeling using both manual and software simulation analysis. Topics include two- and three-dimensional elements along with applications in solid mechanics, heat transfer and fluid mechanics.

Prerequisite(s): MATH2820 And MENG2240

MENG4140 | Senior Design I | Capstone (4 Credits)

Student design teams execute a two semester design project to solve a real world problem. Application of the design process, underlying science, and application of concepts and tools gained in the curriculum are necessary. Application of project management principles and tools. To be taken within 48 credits of graduation or with instructor approval.

Prerequisite(s): MENG2240 And MENG3111

MENG4141 | Senior Design I | Practicum (3 Credits)

Student design teams execute a two semester design project to solve a real world problem. Application of the design process, underlying science, and application of concepts and tools gained in the curriculum are necessary. Application of project management principles and tools. To be taken within 48 credits of graduation or with instructor approval.

Prerequisite(s): MENG2240 And MENG3111

**MENG4211 | Heat Transfer Applications & HVACR w/Lab | Lecture/
Laboratory (4 Credits)**

Apply heat transfer theory to common industrial devices. Analyze HVACR and other applications. Hands-on testing of heat transfer devices includes heat, ventilation, and air conditioning systems.

Prerequisite(s): MENG3250

MENG4240 | Senior Design II | Capstone (4 Credits)

Continuation of Senior Design I projects. Final deliverables are submitted, project is presented and closed out. Presentations are open to students, faculty, and the public in a symposium format.

Prerequisite(s): MENG4140

MENG4301 | Directed Research 1 | Directed Study (1 Credit)

In this individual study course, students work with a supervising faculty member on an engineering research project. The coursework will be determined by the research focus, and will typically include experimental design, data analysis, and synthesis of results in a final presentation (e.g. paper, poster or oral presentation). This course is not available for general enrollment; prior arrangement and approval from the supervising faculty member is required for registration.

MENG4302 | Directed Research 2 | Directed Study (2 Credits)

In this individual study course, students work with a supervising faculty member on an engineering research project. The coursework will be determined by the research focus, and will typically include experimental design, data analysis, and synthesis of results in a final presentation (e.g. paper, poster or oral presentation). This course is not available for general enrollment; prior arrangement and approval from the supervising faculty member is required for registration.

MENG4303 | Directed Research 3 | Directed Study (3 Credits)

In this individual study course, students work with a supervising faculty member on an engineering research project. The coursework will be determined by the research focus, and will typically include experimental design, data analysis, and synthesis of results in a final presentation (e.g. paper, poster or oral presentation). This course is not available for general enrollment; prior arrangement and approval from the supervising faculty member is required for registration.

MENG4304 | Directed Research 4 | Directed Study (4 Credits)

In this individual study course, students work with a supervising faculty member on an engineering research project. The coursework will be determined by the research focus, and will typically include experimental design, data analysis, and synthesis of results in a final presentation (e.g. paper, poster or oral presentation). This course is not available for general enrollment; prior arrangement and approval from the supervising faculty member is required for registration.